

**1.** A method to zoom a region of interest from a digital image comprises the following steps:

(1) define size and location of region of interest as part of source image;

(2) calculate scale of conversion in x- and y-direction;

(3) calculate number of rows of pixels of destination image according to scale of conversion desired in y-direction;

(4) calculate number of pixels contained in a row of pixels of destination image according to scale of conversion desired in x-direction;

(5) calculate color values of each pixel along the rows of pixels of the destination image by interpolation from nearest row of pixels of source image; and

(6) display zoomed region of interest in destination image.

**2.** The method of claim 1 wherein a linear interpolation method has been used.

**3.** The method of claim 1 wherein the color values of the pixels of the destination image being located between the left side edge of the image and the first pixel of the nearest row of pixels of the region of interest of the source image and the color values of the pixels of the destination image being located between the right side edge of the image and the last pixel of the nearest row of the source image are achieved by replicating the color values of said first, or correspondingly said last, pixel of the nearest row of the source image.

4. The method of claim 1 wherein the color values of the pixels of the destination image being located between the left side edge of the image and the first pixel of the nearest row of pixels of the region of interest of the source image and the color values of the pixels of the destination image being located between the right side edge of the image and the last pixel of the nearest row of the source image are achieved by interpolating the color values of said first, or correspondingly said last, pixel of the nearest row of the source image with a neighboring pixels outside the region of interest of the source image.

5. The method of claim 1 wherein said digital image is a color image using any color space.

6. The method of claim 5 wherein said color space is a R-G-B color space.

7. The method of claim 5 wherein said color space is an YCbCr color space.

8. The method of claim 1 wherein said digital image is a video image.

9. The method of claim 1 wherein said digital image is a still image from a digital camera.

10. The method of claim 1 wherein said region of interest has the shape of a rectangle.

**11.** The method of claim **1** wherein said destination image has the shape of a rectangle.

**12.** The method of claim **1** wherein said method invented is used to convert the resolution of the region of interest in any direction.

**13.** The method of claim **1** wherein said method invented is implemented using one common software program.

**14.** A method to zoom a region of interest from a digital image comprises the following steps:

(1) define size and location of region of interest as part of source image;

(2) calculate scale of conversion in x-and y-direction;

(3) calculate number of columns of pixels of destination image according to scale of conversion desired in x-direction;

(4) calculate number of pixels contained in a column of pixels of destination image according to scale of conversion desired in y-direction;

(5) calculate color values of columns of pixels of destination image by interpolation from nearest column of pixels of source image; and

(6) display zoomed region of interest in destination image.

**15.** The method of claim **14** wherein a linear interpolation method has been used.

5       **16.** The method of claim **14** wherein the color values of the pixels of the destination image being located between the upper side edge of the image and the first pixel of the nearest column of pixels of the source image and the color values of the pixels of the destination image being located between the bottom side edge of the image and the last pixel of the nearest column of the source image are achieved by replicating the color values of said first, or correspondingly said last, pixel of the nearest column of the source image.

5       **17.** The method of claim **14** wherein the color values of the pixels of the destination image being located between the left side edge of the image and the first pixel of the nearest row of pixels of the region of interest of the source image and the color values of the pixels of the destination image being located between the right side edge of the image and the last pixel of the nearest row of the source image are achieved by interpolating the color values of said first, or correspondingly said last, pixel of the nearest row of the source image with a neighboring pixels outside the region of interest of the source image.

**18.** The method of claim **14** wherein said digital image is a color image using any color space.

**19.** The method of claim **18** wherein said color space is a R-G-B color space.

**20.** The method of claim **18** wherein said color space is an YCbCr color space.

**21.** The method of claim **14** wherein said digital image is a video image.

**22.** The method of claim **14** wherein said digital image is a still image from a digital camera.

**23.** The method of claim **14** wherein said method invented is used to convert the resolution of the region of interest in any direction.

**24.** The method of claim **14** wherein said region of interest has the shape of a rectangle.

**25.** The method of claim **14** wherein said destination image has the shape of a rectangle.

**26.** The method of claim **14** wherein said method invented is implemented using one common software program.

**27.** A method to zoom a region of interest from a digital image comprises the following steps:

(1) define size and location of region of interest as part of source image;

(2) calculate the scale of conversion of the resolution in x-and y-direction;

(3) calculate number of rows of pixels of destination image according to scale of conversion desired in y-direction;

(4) calculate number of pixels contained in a row of pixels of destination image according to scale of conversion desired in x-direction;

(5) calculate x, y virtual starting point of destination pixel for each frame;

(6) calculate virtual location of first destination pixel for new row in x-direction and interpolate new color values of color space of said first destination pixel from nearest source pixels located at nearest row of source pixels in y-direction;

(7) calculate virtual position of next destination pixel in x-direction according to scale factor and interpolate new color values of color space used of said next pixel from nearest source pixels located at nearest row of source pixels in y-direction;

(8) go to next step (8) if last destination pixel in x-direction has been reached otherwise go to step (6);

(9) go to step (11) if last row of destination pixels has been reached otherwise go to next step (9);

(10) calculate virtual location of next row in y-direction according to scale factor in y-direction and go to step (5); and

(11) display zoomed region of interest in destination image.

**28.** The method of claim **27** wherein a linear interpolation method has been used.

5       **29.** The method of claim **27** wherein the color values of the pixels of the destination image being located between the left side edge of the image and the first pixel of the nearest row of pixels of the source image and the color values of the pixels of the destination image being located between the right side edge of the image and the last pixel of the nearest row of the source image are achieved by replicating the color values of said first, or correspondingly said last, pixel of the nearest row of the source image.

5       **30.** The method of claim **27** wherein the color values of the pixels of the destination image being located between the left side edge of the image and the first pixel of the nearest row of pixels of the region of interest of the source image and the color values of the pixels of the destination image being located between the right side edge of the image and the last pixel of the nearest row of the source image are achieved by interpolating the color values of said first, or correspondingly said last, pixel of the nearest row of the source image with a neighboring pixels outside the region of interest of the source image.

**31.** The method of claim **27** wherein said digital image is a color image using any color space.

**32.** The method of claim **31** wherein said color space is a R-G-B color space.

**33.** The method of claim **31** wherein said color space is an YCbCr color space.

**34.** The method of claim **27** wherein said digital image is a video image.

**35.** The method of claim **27** wherein said digital image is a still image from a digital camera.

**36.** The method of claim **27** wherein said method invented is used to convert the resolution of the region of interest in any direction.

**37.** The method of claim **27** wherein said region of interest has the shape of a rectangle.

**38.** The method of claim **27** wherein said destination image has the shape of a rectangle.

**39.** The method of claim **27** wherein said method invented is implemented using one common software program.

**40.** A method to zoom a region of interest from a digital image comprises the following steps:

- (1) define size and location of region of interest as part of source image;
- (2) calculate the scale of decimation in x-and y-direction;
- (3) calculate number of columns of pixels of destination image according to scale of conversion desired in x-direction;
- (4) calculate number of pixels contained in a column of pixels of destination image according to scale of conversion desired in y-direction;



(5) calculate x, y virtual starting point of destination pixel for each frame;

(6) calculate virtual location of first destination pixel for new column in y-direction and interpolate new color values of color space of said first destination pixel from nearest source pixels located at nearest column of source pixels in x-direction;

(7) calculate virtual position of next destination pixel in y-direction according to scale factor and interpolate new color values of color space used of said next pixel from nearest source pixels located at nearest column of source pixels in x-direction;

(8) go to next step (8) if last destination pixel in y-direction has been reached otherwise go to step (6);

(9) go to step (11) if last column of destination pixels has been reached otherwise go to next step (9);

(10) calculate virtual location of next column in x-direction according to scale factor in x-direction and go to step (5); and

(11) display zoomed region of interest in destination image.